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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference OP020058	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR2002/002251	International filing date (day/month/year) 29 NOVEMBER 2002 (29.11.2002)	Priority date (day/month/year) 30 JULY 2002 (30.07.2002)
International Patent Classification (IPC) or national classification and IPC IPC7 G02B 1/10		
Applicant YUJINTECH21 CO., LTD. et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 27 FEBRUARY 2004 (27.02.2004)	Date of completion of this report 28 OCTOBER 2004 (28.10.2004)
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer KIM, Tae Soo Telephone No. 82-42-481-8284 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR2002/002251

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1-10 13, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under Article 19
 pages _____, filed with the demand
 pages 11, 12, filed with the letter of Oct. 1, 2004
- ☒ the drawings:
 pages 1/1, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed." and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims <u>1-4</u>	YES
	Claims _____	NO
Inventive step (IS)	Claims _____	YES
	Claims <u>1-4</u>	NO
Industrial applicability (IA)	Claims <u>1-4</u>	YES
	Claims _____	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: US 5166345 A (24 November 1992)

D2: US 4756973 A (12 July 1988)

D3: US 5581090 A (3 December 1996)

D1 discloses a photochromic compound derived from a spirooxazine compound. D2 discloses a photochromic lens having a photochromic layer which contains a spirooxazine compound. D3 discloses an ultra-violet detector utilizing a photochromic compound such as spiropyran or spirooxazine.

D2 states that the photochromic coating solution consists of a spirooxazine compound, a solvent and an acrylic resin (see column 3, line 55 to column 4, line 30), wherein the spirooxazine compound has a weight ratio of 1.7-10% (see column 7, line 48; column 9, line 12; and column 11, line 1). D1 shows that the mixing ratio of a spirooxazine-based photochromic resin and an organic solvent is 1:999 to 999:1 (see column 11, line 18). As the solvent (or organic solvent) mentioned above, toluene is used in D3 which dissolves spiropyran or spirooxazine. Claim 1 recites a coating solution comprising 1.5-5wt.% of spiropyran and/or spirooxazine, 60-65wt.% of toluene and an acryl-based binder. Thus, a person skilled in this art can derive, in a straightforward manner, the coating solution of claim 1 and its numerical ratios from D1-D3.

Claim 2 defines the application of the present invention to plastic lenses. D1 already describes the application of a photochromic compound to plastic lenses (see column 11, line 47).

Claims 3 and 4 relate to the process of coating and heat treatment at 30-80° C. D2 also discloses the process of coating and heat treatment at 50-80° C. Therefore, claims 3 and 4 do not involve an inventive step.

(To be continued in the supplemental box.)

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Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of:

Box V.

This international searching authority cannot accept the following in the applicant's letter of 1 October 2004:

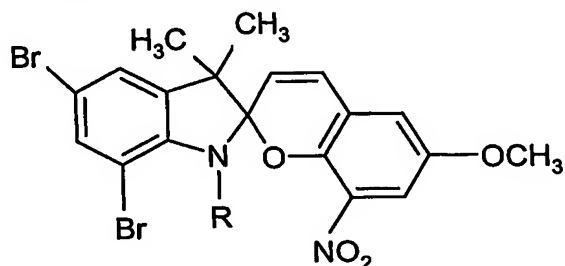
- 1) The applicant claims that the mixing ratio of D1, stated as 1:999 to 999:1, has too wide a range. However, this numerical range shows all the possible mixing ratio which a person skilled in this art can choose as needed, and further, the mixing ratio of claim 1 is obviously within that of D1.
- 2) The applicant claims that the material property of spirooxazine of D1 is different from that of the present invention, which is a slight modification of the substituent. A person skilled in this art can modify the substituent as needed, while maintaining the basic chemical structure, and also the function of material.
- 3) The applicant compares the 40% transmittance of D1 with the 0% transmittance of the present invention. This comparison is considered to be inappropriate since the present invention is related to the ultra-violet ray and D1 is related to the normal light (or visible ray). Moreover, the transmittance of the present invention is also 40% or more in the wave length range of the visible ray (over 400nm). Thus, the applicant's claim that the present invention has a better effect than D1 is not convincing.
- 4) The applicant claims that the coloring time of D2 is about 5 to 10 minutes. However, the minimal coloring time of D2 is about 3 seconds (see column 10, line 56).

All the documents D1-D3 are related to the photochromic material, out of which one can make the photochromic lens or the light-detector. Thus, a person skilled in this art would be motivated to put D1-D3 together.

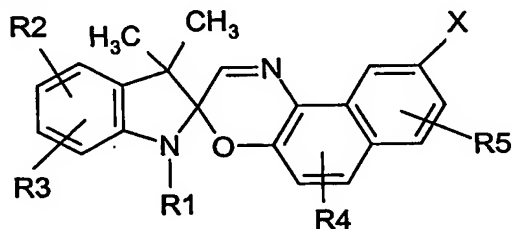
Claims

1. (amended) A coating composition for a plastic photochromic lens, comprising 1.5 to 5 wt% spiropyran compound defined by Formula I and spirooxazine compound defined by Formula II; 60 to 65 wt% toluene; and an acryl
5 based binder to make 100 wt% of the coating composition.

Formula I



Formula II



(wherein,

R is alkyl with 1 to 30 carbon atoms;

R1 is alkyl, alkenyl, or alkoxy with 1 to 10 carbon atoms, or substituted or non-substituted phenyl;

R2 to R5 are independently hydrogen atom, halogen, cyano, nitro, or alkyl or alkoxy with 1 to 6 carbon atoms; and

X is hydroxy, glycidoxy, amine, or dichlorotrioxazinoxy)

2. (unchanged) A plastic photochromic lens coated with the coating composition according to claim 1.

3. (unchanged) A method of producing a plastic photochromic lens, comprising:

5 coating a surface of a plastic lens with the coating composition according to claim 1; and
 heat-curing the resulting structure.

4. (unchanged) The method according to claim 3, wherein the heat-curing is performed at the temperature of 30 to 80 °C.